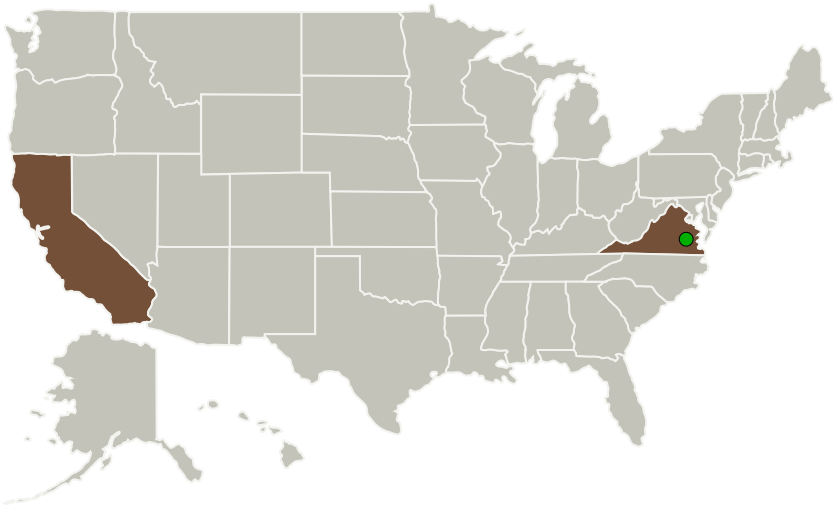
Optical System for Atmospheric Particle Measurement, Phase I

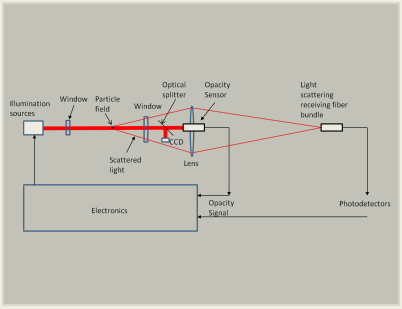
Completed Technology Project (2016 - 2016)

Project Introduction

To measure the broad size range of 0.1 micron to 200 micron, we propose an optical instrument that combines two techniques: Forward scattering light intensity (FSLI) and digital holography (DH). FSLI will provide the size and concentration of particles in the 0.1 to 5 micron range while DH will provide the size, concentration and shape of particles larger than 5 micron. Accurate measurements with FSLI rely on precisely knowing the intensity of the illumination beam at the position of the particle. An innovative fiber optic bundle will select for measurement the particles that cross the very center of the illumination beam where the intensity is uniform and known. The proposed DH strategy will employ small CCD with fast data transfer to enable continued scanning of the atmosphere over many meters or even hundreds of meters. Both technologies will employ small, low power components making them suitable for UAV operation. The Phase I work will include modeling and experimental demonstrations culminating with the conceptual design of a field prototype system.

Primary U.S. Work Locations and Key Partners





Optical System for Atmospheric Particle Measurement, Phase I

Table of Contents

Small Business Innovation Research/Small Business Tech Transfer

Optical System for Atmospheric Particle Measurement, Phase I

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Organizations Performing Work	Role	Type	Location
MetroLaser, Inc.	Lead Organization	Industry Minority-Owned Business, Small Disadvantaged Business (SDB)	Laguna Hills, California
Langley Research Center(LaRC)	Supporting Organization	NASA Center	Hampton, Virginia

Primary U.S. Work Locations	
California	Virginia

Project Transitions

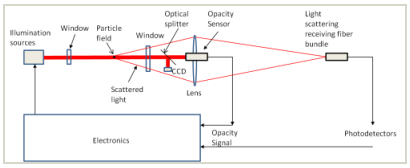
June 2016: Project Start

December 2016: Closed out

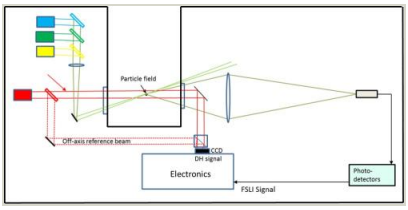
Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/139636)*

Images



Briefing Chart Image
Optical System for Atmospheric Particle Measurement, Phase I
(https://techport.nasa.gov/image/134254)



Final Summary Chart Image
Optical System for Atmospheric Particle Measurement, Phase I Project Image
(https://techport.nasa.gov/image/135217)

Organizational Responsibility

Responsible Mission Directorate:
Space Technology Mission Directorate (STMD)

Lead Organization:
MetroLaser, Inc.

Responsible Program:
Small Business Innovation Research/Small Business Tech Transfer

Project Management

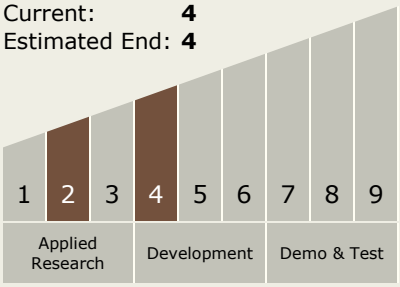
Program Director:
Jason L Kessler

Program Manager:
Carlos Torrez

Principal Investigator:
Cecil F Hess

Technology Maturity (TRL)

Start: **2**
Current: **4**
Estimated End: **4**



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Technology Areas

Primary:

- TX08 Sensors and Instruments
  - TX08.1 Remote Sensing Instruments/Sensors
    - TX08.1.1 Detectors and Focal Planes

Target Destinations

The Moon, Mars, Outside the Solar System, The Sun, Earth, Others Inside the Solar System